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**Sent:** Tuesday, November 13, 2018 8:11 AM  
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**Subject:** Cost Estimates for Wastewater Treatment

Ms. Wildeman,

Thanks very much for taking time to meet with me, Brenda Brickhouse, and Michelle Cagley on October 25th. We enjoyed meeting and talking with you and Owen, and we're grateful to have had the opportunity to share our perspective, concerns, and operational knowledge with you.

During our conversation, you expressed an interest in additional information about the estimated capital costs for construction and the anticipated operation and maintenance costs for new wastewater treatment systems for the once-through scrubbers and flue gas desulfurization wastewater stream at TVA's Cumberland and Kingston fossil plants. We have gathered the following information from our project management and operations staffs:

Cumberland is a 2470 megawatt, two-unit plant whose scrubber has a maximum design flow of 4400 gallons per minute. The construction estimate for Physical/Chemical treatment is approximately \$70M, and the estimated annual Operation and Maintenance (O&M) for operation of that treatment is approximately \$4.5M. To add biological treatment, the construction cost is estimated to be \$101M and the estimated annual O&M costs are approximately \$15M. To put those costs in context, the current average annual non-fuel O&M budget for Cumberland is approximately \$39M. The addition of Physical/ Chemical treatment would raise the annual O&M budget by just over 10 percent, and the addition of biological treatment will raise the annual O&M budget another 40% over current costs.

Kingston is a 1398 megawatt, nine-unit plant whose scrubber has a maximum design flow of 1120 gallons per minute. The construction estimate for Physical/Chemical treatment is approximately \$55M and the estimated annual Operation and Maintenance (O&M) for operation of that treatment is approximately \$1.7M. To add biological treatment the construction cost is \$36.4M and the estimated annual O&M costs are approximately \$6M. To put those costs in context, the current average annual non-fuel O&M budget for Cumberland is approximately \$34M. The addition of Physical/ Chemical treatment would raise the annual O&M budget by just over 5 percent, and the addition of biological treatment will raise the annual O&M budget another 20% over current costs.

As we are in the early design stages, the construction budget numbers presented above should be considered preliminary estimates with an accuracy of -30% to +50%. The estimates will be refined as design progresses.

Please let me know if you have any other questions or would like additional information.

Regards,

*Carolyn*

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